Bay as *L. unifasciata* Cpr. It is figured in Tryon's Man. Conch., vol. 9, pl. 50, fig. 58, as *L. variegata* Cpr. The range is given as from Saginaw Bay, Alaska, to San Diego, California. This seems to be the most common species in California.

Lacuna variegata Cpr., 1864, was described from the Swan collecting at Neah Bay, Wash. (Ann. & Mag. Nat. Hist., vol. 14, p. 429). Of the figures given in Tryon's Man. Conch., vol. 9, pl. 50, Dr. Dall considers fig. 64 to come nearest to it. This figure is given as *L. fusca* Binney, a form of *L. divaricata* Fab. The range is given as from Neah Bay, Wash. to Monterey, but it has been collected at several points in Southern California as far south as Reef Point, Orange County.

The last three species and var. *aurantiaca* Cpr. are quite similar in form and texture, but in typical specimens the color pattern is quite different. *L. unifasciata* Cpr. is uniformly light brown with a narrow brown line on the keel of the body whorl. Var. *aurantiaca* Cpr. is orange white without color markings. In *L. marmorata* Dall, the keel of the body whorl is marked by alternating white and brown spots and a spotted pattern frequently extends over more or less of the shell. The colors of *L. variegata* Cpr. are clouded or in zigzag stripes and the keel of the body whorl is often marked by white splashes. The details of the color pattern vary considerably and fade in dead shells and cabinet specimens. If the separation into different species is to be based on this color pattern, var. *aurantiaca* Cpr. should be given specific rank. It might just as well be a variety of one species as of the other.

NOTES ON ACANTHINA FROM CALIFORNIA.

BY A. M. STRONG

The proper arrangement of the various forms belonging to the genus Acanthina, formerly Monoceros, which are to be found in California has been a puzzle to all the writers. The few specimens which reached the early writers were seemingly easily separated into distinct species and a number were

named. As larger series became available for study many intergrades were found and the question of varieties and later of priority of names became a difficult one. Dr. Dall in Bulletin U. S. National Museum, No. 112, 1922, recognizes *Acanthina spirata* Blainville, 1833, as the first name used and therefore the typical form. All other California forms, with the exception of two species from the southern fauna found as far north as San Diego, are reduced to varieties.

Conrad in 1837 described three species from Santa Barbara, *Monoceros engonatum*, *Monoceros brevidens*, and *Monoceros lapilloides*. At about the same time Sowerby described *Monoceros punctulata* and *Monoceros unicarinatum*. At various later dates the specimens in the early European collections were redescribed and figured by Reeve, Deshayes, Gray and Keiner, seemingly without much regard to the use of the names. Dr. Carpenter in the Proc. Zool. Soc., 1856, p. 228, gives the synonymy as follows:

Monoceros engonatum Conrad
= *Monoceros unicarinatum* Reeve, *non* Sowerby *nec.* Deshayes
= *Monoceros unicarinatum* pars, Deshayes
Comp. *Purpura spirata* Blainv.

Monoceros brevidens Conrad
= *Monoceros unicarinatum* Sowerby *non* Reeve *nec.* Deshayes
Non *Monoceros brevidentatum* Gray

Monoceros lapilloides Conrad
= *Monoceros punctulatum* Sowerby
= *Monoceros punctatum* Gray
= *Monoceros punctatum* Reeve

Dr. Carpenter's comments in this connection are of interest. Under *M. engonatum* Conrad he says: "The shell figured by Conrad and found in Mr. Nuttall's collection is very triangular, with a pointed base. The *P. spirata* of Blainville is a Sandwich Island shell, brought by M. Botta, very obtusely angulated, with a swollen base, scarcely acanthoid, and a canal long enough for Chorus, Gray. It is remarkable for the scaly keel of the upper whorls. This shell is reproduced by Keiner

in a different form, who affiliates Sowerby's species to that in the Paris Museum. Deshayes, copying this error, and not even adopting Blainville's earlier specific name, gives the name and reference of Sowerby, with a description in the main belonging to the Blainville species, although perhaps with some additions from Sowerby's figure. Mr. Reeve completes the confusion by describing a shell, 'anfr. superne angulatis,' very probably the true *engonatum* of Conrad, which he quotes; at the same time quoting the two different shells above named (one of them under two names, *P. spicata* and *P. spirata*), and figuring a very different shell, not angulated at all. To mere learners, like the author of the present paper, such differences are exceedingly perplexing." Under *Monoceros brevidens* Conrad he says: "The exact date of Sowerby's species, which is generally referred to *P. engonata* of Conrad, but differs from the figure of that shell, and agrees much better with the description of this, is difficult to determine. The volume bears the date 1841. It differs from *P. engonata* in being swollen at the base, with less sculpture and angulations." Finally, in regard to all three forms appears this: "The differences between the specimens of California Monoceros are so numerous, and similar specimens from other quarters are so variable, that the three species here repeated from Conrad are given with very great hesitation. That the forms figured by Sowerby and Reeve are conspecific, is by no means improbable; the form *engonata* is the most aberrant but it is by no means unapproached."

Later Dr. Carpenter evidently changed his mind to some extent in regard to the different forms, as in his Supplemental Report, 1863, p. 663, he lists three forms from the California coast, as follows:

Monoceros engonatum Conrad = *unicarinatum* Sowerby. Brown-dotted, with sharp posterior keel, smoothish.
Monoceros ? var. *spiratum* (Blainv.). Light colored, scaly; horn not developed.
Monoceros lapilloides Conrad = *punctatum* Gray + *brevidens* Conr. Not shouldered, shape of *lapillus*.

For many years writers on California shells and the collectors

have been following Carpenter in the use of *engonatum* Conrad and *lapilloides* Conrad for the two common forms.

Spirata Blainville has been regarded as a variety of *engonata* Conrad by nearly all writers. Arnold mentions it in his Paleontology of San Pedro, p. 246, as follows: "Specimens showing the scaly surface of var. *spiratum* grade over into the smooth form; the sharp-keeled forms merge into those which approach very near to *M. lapilloides*. Some specimens have thin and smooth outer lips, while others are strongly dentate. Of fifty specimens from the San Pedro Pleistocene only three have the characteristic tooth developed, thus showing that in the earlier form this distinguishing character was only occasional. The scaly specimens are generally the strongest keeled. This later form is the var. *spiratum* of Blainville." Stearns, in the Am. Journ. Conch., vol. 7, 1872, applies the name of var. *spirata* Blainv. to a local form found at San Diego, while it is stated in Tryon's Man. Conch. that *spiratum* Blainville and *engonatum* Conrad are undoubtedly the same. If we are to take the light-colored scaly variety described by Carpenter and Arnold as the typical form for the species, the darker and smoother form which has so long been recognized as having at least a varietal difference should take the name of *Acanthina spirata* var. *engonata* Conrad, 1837.

It is pretty generally recognized that all gradations are to be found between the forms long known as *Monoceros engonata* and *Monoceros lapilloides*. Dr. Dall gives the date for Sowerby's *Monoceros punctulata* as 1835 and *Monoceros lapilloides* becomes *Acanthina spirata* var. *punctulata* Sowerby, 1835. It is the form found on the exposed rocks of the outer coast and under a different environment takes on a distinct form.

Another variety, *Acanthina spirata* var. *aurantia* Dall, was described in Proc. U. S. Nat. Mus., vol. 34, p. 248. This is a color form of variety *engonata* Conrad. Similar orange or lemon tinted specimens of quite a number of California shells have been given varietal names.

Acanthina paucilirata Stearns, 1871, was described from San Diego in Conch. Memo. No. 6, p. 1. The species is stated

by Lowe (Nautilus, vol. 27, p. 26) to be "In their prime" at Cape Colnette, Lower California. In general shape they are quite similar to small specimens of variety *punctulata* Sowerby but the color pattern is quite distinct. They are "externally painted with longitudinal broad black and narrow whitish streaks, interrupted by the white dental groove," thus cutting the black colored streaks up into large squares. In variety *punctulata* the light color predominates and the dark is reduced to small square dots. A large series recently collected near Laguna, Orange County, show markings intermediate between the two. It is quite probable that further collecting and study will show that *paucilirata* is only a southern form of variety *punctulata* and it will also have to be classed as a variety of *Acanthina spirata* Blainville.

The Lower California species *Acanthina lugubris* Sowerby, 1822, is reported from San Diego on the strength of a single specimen found there some years ago. Orcutt reports it quite common as far north as the International Boundary Line. It has been stated that *Acanthina paucilirata* Stearns forms the connecting link beween *lugubris* and *engonata*. If further collecting along the northern portion of the coast of Lower California, where the ranges of the different forms overlap, shows the full series of intergrades, still further changes in the nomenclature will have to be made. In groups of this kind where the forms are so variable it is difficult to draw the line between variety and species, and the question of possible hybrids is always present.

MARINE SHELLS OF DRIER BAY, KNIGHT ISLAND, PRINCE WILLIAM SOUND, ALASKA.

BY WALTER EYERDAM

During the summer of 1923, while engaged at my trade as cooper in the herring saltery of the Knight Island Packing Co. in Drier Bay, Prince William Sound, I utilized much of my spare time in dredging and searching for shells along the beaches.